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Rehabilitation of the Tuberculosis Patient ---The Manitoba Program

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AN organized rehabilitation program has been recognized for many years as needful to re-establish the tuberculosis patient socially and economically after a long period of sanatorium treatment. Foster (1), Porter (2), Hatfield (3), and many others have stated cogently and in detail the arguments in favor of such a program.

Modern case-finding and therapeutic methods have brought about a change in our attitude towards rehabilitation. Today many more patients are brought under treatment with minimal or moderately advanced disease. Surgical therapy is much improved. A vast majority of discharged patients feel and look well and have a reasonable reserve of strength. Discharge of positive-sputum cases is not generally condoned in any circumstances and need not be considered in the rehabilitation program.

As a consequence of this altered state of affairs, the primary aim in rehabilitation today must be to direct the ex-patient as rapidly as health permits into a normal place in the world of work. Only as a secondary factor might sheltered industry be considered to provide at least partial self-support for that minor proportion of patients whose restricted health and strength will never permit them to become entirely independent in a competitive world.

Modern technological progress has resulted in machines doing most of the heavy, energy-consuming work. A premium is placed on the skill rather than the physical strength of the worker. This is a factor of incalculable value in placing the tuberculosis ex-patient on an equal footing with his more robust

competitors. It opens the door to a wide range of job opportunities that even a few years ago would have been closed to him. Today, provided the occupation is carefully selected, there can be no excuse for not directing the ex-patient into a normal place in business or industry where his health will not be endangered. Only in this way can he assume his rightful position as a useful and independent member of society.

A Rehabilitation Division, organized under the Sanatorium Board of Manitoba, commenced operations on May 1, 1942, with three main factors in its program: vocational counselling, vocational training, and placement direction and assistance.

Specialized vocational guidance is necessary because many patients have come direct from school and have no work experience; many others have to change their occupations. Being proficient at one's job, and finding in it a certain pleasure and satisfaction, are vital to happiness and health. In the case of persons who have some physical handicap, it is doubly important that ambition be properly guided. Training is essential because as far as possible ex-patients seeking employment should be prepared to offer superior skill to offset any physical handicap. Placement direction and assistance completes the cycle.

In establishing a Rehabilitation Division, every effort should be made to avoid duplicating and overlapping the work of other established social agencies. In the Manitoba Division the Director of Rehabilitation and a secretary constitute the entire staff. The Director does all interviewing and vocational counselling; he arranges all enrolments in vocational-training courses; where it seems desirable he interviews employers; he issues to employers and personnel managers recommendations with reference to ex-patients; where necessary he makes direct placements, but this he does only in occasional instances.

The Division is not an employment agency, nor a social-welfare agency in the usual sense of the term. Rather, as we conceive the duties and responsibilities of a Rehabilitation Division, the objective should be to utilize presently established, expert, full-time organizations whose business is education, employment, or resolving social problems, in order to meet adequately the special needs of tuberculosis patients and ex-patients. In the vocational field there should be offered a well-informed professional service comparable to that offered by the physician in the field of medicine.

In Manitoba, physicians and staff in the three sanatoria and in the tuberculosis clinics have been generous in their counsel and support of our rehabilitation program. From the beginning we have had splendid assistance from the Provincial Department of Education. Public health and social workers have given freely of their help. We now have a system that utilizes very satisfactorily the facilities of the Employment and Selective Service offices. Their experienced personnel have given us excellent co-operation. The integrated participation of all these agencies has facilitated the functioning of our Rehabilitation Division.

PROCEDURE

A preliminary card record for each new sanatorium admission is set up in the Rehabilitation Division from the files of the Central Tuberculosis Registry. In addition to name, age, nationality, place of birth, etc., this record contains the classification of the patient's disease as defined in the Diagnostic Standards of the National Tuberculosis Association. Added to this is a work-tolerance prognosis giving the physician's estimate of the patient's capacity for work after his treatment has been completed. Such a prognosis is essential if the vocational counsellor is to be in a position to give intelligent advice to the patient as to the direction his sanatorium study and post-sanatorium plans should take. The classification system and code used is as follows:

- WTP 0 Unlikely to recover.
- WTP 1 Unlikely to be able to work.
- WTP 2 Unlikely to be able to do more than part-time or very light work.
- WTP 3 Expected to be able to do full-time light work.
- WTP 4 Expected to be able to do full-time normal work.

It should be noted that in no circumstances is it considered that ex-patients should do heavy manual labor. Hence "normal work" does not permit such labor, but it includes jobs entailing a fairly substantial expenditure of energy. "Light work" for the most part is defined as of sedentary nature. It includes both office work and such jobs as machine tending, etc.

Medical control must be maintained throughout if a rehabilitation program is to function as it should. The work-tolerance prognosis mentioned above is one means of control. A second means is the physician's work-prescription which is indicated as follows:

- R1 to R4: "Restricted work"; i.e., study in the sanatorium from one to four hours per day, as indicated.
- L4: Half-time light work.
- L8: Full-time light work.
- N8: Full-time normal work.
- D1 to D6: "Deferred"; i.e., in sanatorium, not permitted to study; outside sanatorium, not permitted to work—from one to six months, as indicated.

While this classification may seem lengthy in explanation, in practice it is simple and speedy to use. The sanatorium or clinic physician notes, for example, Mod. Adv. bac., WTP3—R2. From this code the vocational counsellor obtains a wealth of information, enabling him to advise the patient with reasonable assurance, basing his attitude directly on the physician's wishes and opinion with regard to the individual case.*

*Dr. K. C. Johnston, Assistant Medical Director of St. Boniface Sanatorium, who has had considerable experience in applying this classification both in sanatorium and out-patient clinic, comments as follows on its usefulness:

"This system of foretelling the working ability of the tuberculous patient has given us a basis of exact standards. It is admitted that certain changes may occur for better or worse which will occasionally alter the immediate prognosis and may hasten or prolong the ultimate phase. However, the scope of the classification allows for leniency in this respect. When the deviation from the expected course continues it is of small consequence to re-classify the patient since the changes are most likely to occur at an early stage in the treatment. For those who understand the possibilities of the disease and are experienced in after-care of tuberculous patients, the work-tolerance prognosis can be quite easily reckoned.

With this preliminary information, the Director of Rehabilitation interviews all patients admitted to sanatorium except housewives, patients over 60 years of age, children under 14 years of age, patients with a "D" classification, and patients classified WTP 0 or 1.

Patients are brought to an office or examining room set aside for this purpose since privacy is essential. Clinical counselling procedure requires that a complete educational and occupational history be taken; that the patient's hobbies, interests, abilities and aptitudes be explored; that the individual's particular job opportunities be examined; that the patient's medical classification be consulted. In the light of these factors and the counsellor's knowledge of particular job requirements and prospects in various occupational fields, a post-sanatorium re-establishment program is considered. Where study is permitted, the patient is encouraged to utilize his sanatorium time to vocational advantage.

APTITUDE TESTS

We have been rather conservative in introducing the many aptitude tests now available. We feel that, for many of them, norms based on testing of school groups or sections of the general population are of doubtful validity as measures of traits, attitudes and aptitudes of tuberculosis patients. We have found two well-known tests most useful: the Otis Higher Examination to check scholastic ability; and the Minnesota Test for Clerical Workers, to check aptitude in the clerical field. We have also found Strong's Vocational Interest Blank very helpful in special cases where such a survey of interests is indicated. We believe that selected aptitude tests are valuable tools, and it is our intention to introduce certain additional tests.

TRAINING

Training within the sanatorium is provided through an excellent series of correspondence courses made available at a very low fee through the generous co-operation of the Manitoba Department of Education. For patients from the Armed Services, the correspondence courses from the Canadian Legion War Services are provided. In one sanatorium a resident teacher works in conjunction with the Rehabilitation Division, giving instruction in academic subjects and supervising in a general way vocational correspondence instruction. Some 150 short unit-courses are available but the following enrolments were actually arranged in the 18 months ending October 31, 1943: Air Conditioning 2, Estimating, Blueprint Reading etc., for Building Trades 5, Bookkeeping 31, Interior Decorating 1, Essentials of Distribution 1, Dressmaking 2, Economics and Social Studies 8, Business English 3, Aeronautical Engineering (short

"Prior to the use of this method of prognosis, a patient's ability to work was expressed in degrees of disability. This procedure naturally led to confusion since it gives no information as to the amount or type of work that actually can be prescribed. . . . With the present method we can state at once the type of work to which the patient will probably return and also give him a work prescription, specifying exactly the amount of work that he can do now. The prescription may change to suit the circumstances but in most cases it will gradually increase from the few hours spent at study in the sanatorium to the final work period recommended in the work-tolerance prognosis." (4)

units) 3, Diesel Engines 1, Electrical Engineering (short units) 22, Steam Engineering 1, Fiction Writing 6, Vocational Mathematics 45, Mechanical Drawing and related subjects 13, Photography 2, Radio 5, Selling 5, Typing 57, Watch Repairing 2. At the same time academic studies have been undertaken ranging from public-school grades through high school to second-year university.

It was felt from the beginning that it is inadvisable from both the financial and psychological standpoints to make these vocational courses available to patients entirely without charge. Payment of even a small fee engenders a greater feeling of independence and responsibility. Consequently all enrolments for vocational courses and high-school correspondence courses require payment by the patient of a fee ranging from a few cents to four or five dollars.* In those isolated instances where it is indicated, fees are taken care of by welfare agencies in order to enable genuinely ambitious patients to study. Thus lack of money is never a barrier to utilizing fully the services offered by the Rehabilitation Division.

The Department of Education furnishes the Division with monthly progress reports on all vocational-course enrolments, enabling the Director to give necessary general supervision over the whole training program.

A final and important means of medical control over study in the sanatorium is provided by means of the enrolment memorandum. When a patient is enrolled in a course of study, a memorandum countersigned by the Director is sent from the Rehabilitation Division to the Medical Superintendent of the institution. It reads as follows:

This memorandum confirms the fact that.....has been enrolled in a course of study in..... His instruction will be from the.....school. He is authorized to spend..... hours per day in this study.

.....
Director of Rehabilitation.

.....
Medical Superintendent.

Provided the enrolment has his approval, the Medical Superintendent signs the memorandum and sends it on to the patient via the ward nurse. This prevents a patient whose condition may have deteriorated since the original classification was provided from undertaking study unwisely; signifies specifically to the patient that the Medical Superintendent knows of and approves his study; and informs the nurse on the ward how long the patient is permitted to study.

Establishment of the ex-patient in a physically suitable occupation that will make him self-supporting is the goal of any rehabilitation program. Our primary service in this direction is to offer counsel and direction as to where the ex-patient might best apply for work; give an informed opinion whether it is advisable to undertake specific employment; investigate opportunity in a given field; build up the ex-patient's self-confidence in his ability to work; advise

*A course in elementary bookkeeping costs the patient only \$3.75 for each of the three units in the whole course. A course in typing can be had for as little as \$1.15 for each of the three units in the complete course. The patient enrolls and pays for only one unit at a time. Credit for enabling us to employ this very convenient and effective system must go to the Technical Branch of the Manitoba Department of Education, under the direction of Mr. R. J. Johns, and the wholehearted co-operation and approval of the Minister of Education, the Honorable Ivan Schultz, K.C.

him with regard to Selective Service regulations; and utilize fully the facilities of the Employment offices. After considerable "trial and error" experience and conference with Selective Service officials, we now have an arrangement whereby ex-patients being referred by us for placement are given a letter addressed to the proper Employment Service official, indicating in a general way the work for which they are best fitted. Our recommendation is then followed as closely as possible by the placement officer. Thus ex-patients receive informed, sympathetic consideration in seeking employment. When direct placements are made, the necessary permit from Selective Service is arranged for.

What has been the result of this program? Today in Manitoba only three of four ex-patients known to us, medically classified as fit for work and with reasonable employment qualifications and the desire to work, are without employment.

The stipulations in this last sentence are important. The "placement guidance and assistance" factor in rehabilitation cannot begin to function until the patient is brought to the point in his treatment where he is physically able to perform useful work. Like anyone else, the ex-patient must have some worthwhile skill to offer an employer. He must have the qualifications to perform some economically useful task. He must have the will to work. Certain patients, unfortunately, lack these attributes even before invasion by tubercle bacilli. The Rehabilitation Division has no magic means of transforming such people into the type which personnel men will vie with one another to employ.

One important benefit of the rehabilitation program is the improvement in sanatorium morale. The fact that almost immediately after admission there is serious discussion of what occupation the patient is to follow after discharge has a marked effect on his attitude towards treatment. Many of the worries which plague the new patient are relieved by this positive approach to the future. Dr. E. L. Ross, Medical Superintendent of Manitoba Sanatorium, comments on the merit of vocational training as follows: "From the Sanatorium viewpoint, I can say that vocational training of patients, apart from its practical significance, contributes greatly towards maintaining morale and contentment. Each day is not just another in a number of pointless days, but is a day with an interest, a purpose, mental exercise compensating for physical inactivity which is an important factor in the restoration of health." (5)

It is important that all engaged in the tuberculosis field appreciate the boundaries of the work of rehabilitation. For instance, elderly people with little education, and who have been employed as labourers on construction projects etc., occasionally apply for rehabilitation assistance. But if they have had tuberculosis requiring much in the way of treatment, it would seem both difficult and unwise to attempt to re-establish such persons. One must avoid attempting the impossible in a burst of ill-advised enthusiasm.

We can give the ex-patient the opportunity to train for a job and thus place himself in a position to compete fairly in the labor market. If employment is available, we can direct him into avenues of work in which he is not vocationally handicapped nor discriminated against because of his former illness.

But we cannot undertake to solve the general problem of unemployment, and if it happens at any time that a considerable number of people are unemployed, we must expect that some tuberculosis ex-patients will be among their number.

Time will no doubt bring new developments and adaptations in dealing with the problem of rehabilitation. With nearly two years of experience the Rehabilitation Division of the Sanatorium Board of Manitoba is encouraged to continue its work.

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CANADIAN PUBLIC HEALTH ASSOCIATION

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ONTARIO HEALTH OFFICERS ASSOCIATION

Present Problems in Industrial Health

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WARTIME industrial expansion has produced an increase in the incidence of industrial accidents and occupational disease out of proportion to the increase in numbers employed. Although the war has introduced new problems, the increased incidence of occupational disease is largely due to increased exposure to common substances and processes.

THE EFFECT OF WAR ON OCCUPATIONAL DISEASE

Sudden expansion of industry with resultant overcrowding, excessive hours of work, lack of adequate engineering control, and great numbers of inexperienced help produced an early increase in occupational disease. The increasing numbers of women, substandard males and young people employed further affected the rate. The ever-increasing shortage of critical materials has created the necessity of using toxic substitutes. The demand for maximum production and the demand for specialized war equipment have created new hazards and have revived old ones. In certain instances women and young persons have succumbed to minor exposures which formerly were thought to be safe.

In the haste associated with rapid expansion, standard accident-prevention devices have often been omitted; toxic dusts and fumes have gone uncontrolled, and dangerous processes have occasionally been installed without knowledge of their effect on health. The induction of inexperienced help into dangerous trades has taken place often without adequate training periods. These factors have influenced the incidence of occupational disease.

The unprecedented demand for solvents has not only been responsible for the constant introduction of new ones of unknown toxicity, but has created the necessity of using those known to be highly toxic. Benzol poisoning, for some years practically unknown, is again occurring. Benzol is now frequently used as a solvent in waterproof cements, lacquers and paint removers in place of its less toxic homologue, toluol. Severe cases of benzol poisoning have occurred recently with the use of waterproof cements. Repeated exposure to benzol fumes produces profound changes in the blood picture similar to that found in pernicious anaemia. All elements of the blood are affected. Red blood cells, white blood cells and platelets are all reduced with chronic exposure. The symptoms of chronic absorption are very indefinite—perhaps only fatigue and loss of appetite—while the blood may already have been damaged beyond

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repair. Benzol cannot be used safely without engineering control and periodic examination directed to the early detection of blood changes, e.g., fall in haemoglobin and reduction in white blood-cell count.

The frequent substitution of degreasing solvents for alkalis in some metal-cleaning processes has led to the widespread use of the non-flammable chlorinated hydrocarbons—trichlorethylene and carbon tetrachloride. Both are powerful anaesthetics. The former, as used before the war, seldom caused more than a transient narcosis with acute exposure. Cumulative effects did not become evident. The extent of its use under present conditions is causing some concern. The present control of fumes by condensation has been unsatisfactory, and where degreasing machines are used to capacity they should be totally enclosed or equipped with exhaust ventilation.

Carbon tetrachloride is extremely toxic. Concentrations not even detectable by sense of smell may give rise to severe gastro-intestinal symptoms. Higher concentrations may produce irreparable damage to liver or to kidney. Due to scarcity of trichlorethylene, carbon tetrachloride is occasionally substituted, with resultant epidemics of gastro-intestinal disturbance and an occasional severe case of poisoning. It is impossible to use carbon tetrachloride in any but enclosed or well-ventilated processes without affecting health. Few solvents produce such severe damage to the liver as that produced by carbon tetrachloride. There is, however, evidence to suggest that most solvents are potential liver poisons, and excessive exposures should always be avoided.

The impregnation of cables and electrical appliances with flame-proof and moisture-proof chlorinated waxes creates a hazard in the production and installation of this equipment. Exposure through contact with these waxes may result in severe acne; absorption may result in necrosis of the liver. Fatalities have occurred after industrial exposure. If personal hygiene is neglected, members of a worker's family can be significantly exposed by contact with contaminated clothing. Prevention is secured by medical selection of employees, by strict supervision of personal hygiene, and by the use of protective clothing.

Scarcity of such critical metals as tin and zinc has created a marked increase in the use of cadmium as a constituent of solders and in rust-proofing steel. Cadmium, when volatilized by heat, is a lung irritant which may give rise to acute pulmonary oedema. Fatalities are prevented by placing at complete rest those persons who have been exposed and who experience tightness in the chest. Shortages of certain metals, together with war-time specifications for spray paints, have produced a marked increase in the number of persons exposed to lead. This has effected a sharp increase in the number of cases of lead poisoning. Acute lead poisoning is serious, disabling and costly. With lead absorption short of acute poisoning, much general ill health exists, with symptoms referable to the gastro-intestinal tract. The number of cases of lead poisoning reported, therefore, does not give a true picture of the actual morbidity. Any process where lead dust is produced, or where lead is volatilized by heat, requires medical investigation and supervision.

Welding has greatly accelerated the production of ships, army vehicles

and aircraft. In order to meet the demand, large numbers of welders have been trained. They, and their assistants, are exposed to such physical hazards as burns, ultraviolet radiation and electrocution; to chemical hazards created by volatilization of the metal or metal coating—lead, cadmium, zinc; by volatilization of toxic elements in the flux—fluoride, or by the formation of carbon monoxide or oxides of nitrogen directly from the air. Welding is a dangerous trade, requiring suitable local or general ventilation, protective equipment and supervision.

Shortage of steel has led to the necessity of replacing steel shot with sand in both new and old sand blast equipment. This change has brought about a return of the silica hazard.

The demand for precision instruments has created an exposure, on an unprecedented scale, to radium. Luminous paints contain radioactive materials such as radium and mesothorium. Radium may be taken into the body by inhalation of radium dust or of radon gas, by ingestion of radium dust, and by absorption of gamma rays through the body surface. The effects of radium, like those of lead, are cumulative. The late effects of gross absorption are aplastic anaemia, necrosis of bone, and ulceration of the skin. This last condition may lead to malignant degeneration. It is quite possible to use radium paint with safety, provided there be no opportunity for radium storage in the body. To ensure this, careful engineering control is essential, and periodic physical examination directed to the early detection of blood changes and the estimation of the amount of stored radium are routine for those persons who are exposed. Similar supervision is required for inspectors using radium or X-ray units for the inspection of metal castings or of welds.

Dermatitis is the chief hazard of the munitions plant. T.N.T., D.N.T., tetryl and mercury fulminate are all skin sensitizers. About 15 per cent of all persons exposed develop skin eruption. Were it not for the precautions taken, this number would be considerably increased. Of the sensitized group, only a few must be removed from exposure. In Great Britain during the last war, 15 per cent of those exposed to T.N.T. were poisoned, and many deaths occurred. Suitable control measures have reduced the incidence of poisoning to a negligible figure, and in Canada only one or two deaths have occurred.

The nitration process in the manufacture of explosives produces an exposure to nitrous fumes which are pulmonary irritants. Here again, many cases of pulmonary oedema have probably been prevented by giving any workers who have been exposed a period of absolute rest.

Industrial skin eruption accounts for sixty to seventy per cent of the compensated cases of occupational disease, and assumes large proportions as a cause of lost time and discomfort. In some instances it is more costly and important as a cause of lost time than industrial accidents. There is a current tendency in the medical profession to consider all skin eruption to be of occupational origin until proven otherwise, even those occurring among persons who have not been exposed to skin irritants or sensitizers. Skin eruption due to primary irritants—acids, alkalis and solvents—usually affects exposed parts,

disappears on removal of the worker from exposure, and recurs when he returns to exposure. Eruption due to sensitizers is more difficult of diagnosis, since only the sensitive individual is affected, and the eruption is more prone to generalization. Skin eruption is very disturbing to workers and interferes with production probably more than any other occupational disease. Criteria should be carefully considered before deciding that the work is the etiological agent. By education of the employee, by reduction of skin exposures, by the use of protective clothing and the adoption of improved personal hygiene, serious epidemics of skin eruption have been reduced until they are now infrequent. Explosives, cutting oils, alkalis and solvents are the common skin irritants.

Although classical cases of occupational disease account for but a relatively small amount of lost time in relation to total sickness, actually less than 5 per cent, prolonged exposure to minimal concentrations of toxic dusts or fumes is undoubtedly responsible for much chronic ill health. This may pass unrecognized, or be wrongly attributed to other causes. Knowledge of the process is of first importance, as for example in the diagnosis of occupational skin eruption. Recognition of the subclinical effects of lead or of carbon tetrachloride absorption is possible only after detailed enquiry into the occupational history, and in some cases only after a careful investigation of the exposure in the plant. Such problems can only be approached and controlled through a closer relationship of the practising physician to industry.

MAINTENANCE OF HEALTH IN INDUSTRY

The physician's job in industry reaches far beyond the control of occupational disease and the supervision of first aid in industrial accidents. Ninety per cent of sickness absence in industry is due to ordinary sickness—tuberculosis, pneumonia, appendicitis, cancer, venereal disease, peptic ulcer, and the common cold. Much of this illness can be prevented by early diagnosis and by early application of treatment. It is well known that the specific measures for the prevention of ill health in adults, such as smallpox vaccination, are few. Even mass administration of oral vaccine against the common cold has not proved itself. The daily association of persons in industry provides an economical means for the application of the known measures for the control of ill health.

Today pre-employment physical examinations are a common practice in industry. This is not done for the purpose of excluding those workers found to have defects, except in cases where the defect might present danger to the afflicted worker or to others, but to enable placement which is suitable to the physical and mental capabilities of the applicant. Such practice also yields information regarding the health level of the persons employed. A venereal-disease program, for example, is carried out not with a view to excluding those workers found to have positive seradiagnostic tests, but to encourage those with syphilis to obtain adequate treatment. Those with any indication of the late effects of syphilis require careful placement to avoid possible injury to themselves and to others.

Selective periodic physical examination as carried out when workers

transfer or when they return to work after illness, and when they visit the dispensary repeatedly, is used as a follow-up to determine the effect of occupational exposures on health, and to detect changes in physical findings, so important in early diagnosis of common ailments.

It must be emphasized that pre-employment physical examinations which are not followed up by other aspects of a medical program have a greatly reduced value.

The reporting of minor complaints of ill health is being encouraged. This is not done with a view to producing mass psychoneurosis. Any workers who have functional complaints in the absence of organic disease are reassured. It is done in order that those with early signs of disease may be referred for treatment. Industry is a convenient place to promote a nutritional program both through individual educational measures and through the plant cafeteria where control of the menu is possible. The plant physician is in a position to discourage the use of mass vitamin therapy meant to take the place of an adequate diet.

From the practical standpoint, early tuberculosis can be detected only by X-ray examination. Today, when facilities are available for mass chest survey on miniature films, no industrial medical program can be considered complete if it leaves a possible open case of tuberculosis free to infect others in the plant.

The physician can often do much to prevent fatigue and maladjustment by suggesting suitable hours of work, suitable spacing of rest pauses, and suitable intervals of change from day to night shift. His attention to the control of toxic exposures, posture, lighting and excessive noise will be attended by reduced fatigue and increased production.

The plant physician assumes the responsibility for seeing that the worker obtains adequate treatment for non-occupational sickness, but he seldom undertakes more than emergency treatment for other than industrial accidents or occupational disease. He can, however, materially assist in rehabilitation of the sick or injured workman. He can facilitate his early and safe return to work.

The war has aroused considerable interest in the health of workers, and medical services have been extended, but it is chiefly those working in the larger plants who have the advantage of this type of supervision. In plants of less than two hundred employees, medical supervision has seldom been undertaken. One-third of Canadian workers are employed in plants with less than two hundred employees. In order to reach this group, it is necessary that the part-time services of practising physicians be made available within industry on a much wider scale. To provide such a service, a physician must spend about one hour a week, and a nurse about one day a week, for each hundred employees in the plant.

Employers seldom realize the importance of medical supervision until it is pointed out that such a service is likely to reduce absence by twenty to thirty per cent; it will reduce industrial accidents and occupational disease;

it will, by raising the level of general health, increase both efficiency and production, and it will effect an improvement in industrial relations.

The practising physician may fail to realize the important public-health opportunities which industrial medicine affords. He is apt to consider an industrial post in the light of traumatic surgery. It must be admitted that the health officer has often failed to take advantage of his association in the community to interest employers and physicians alike in adult health. Both groups should realize that there is a real opportunity to promote adult health and prevent general sickness among employees. Nevertheless, even where an industry lends itself well to this purpose, adequate health supervision is only accomplished when the employer realizes the necessity of employing a physician. To be of value, the physician must be prepared to carry out a program covering examination on employment, periodic examination, control of occupational disease, supervision of first aid, early diagnosis, rehabilitation, and health education. The health officer's job is particularly important in relation to small industries, where he might be instrumental in combining plants for the purpose; where he may obtain part-time visiting nursing services, and where he can help to organize and co-ordinate plant medical services with those in the community.

In the United States there has been much active interest in the subject. In Great Britain legislation was passed enabling the Chief Inspector of Factories to require whole- or part-time physicians in munitions factories, and here in Canada the terms of contract of the Department of Munitions and Supply stipulate that the contractor shall provide medical attendance to the satisfaction of the Department of Pensions and National Health. Except in a few instances, these services continue to be established on a voluntary basis, with the result that less than fifty per cent of Canadian workers have the advantage of any direct health supervision.

When so much continues to depend on production, the acute shortage of full-time medical personnel does not justify the existing apathy. It merely serves to emphasize the need for the part-time services of the practising physician in industry.

Cancer Control in Saskatchewan

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TWENTY years ago a health department which attempted to include a cancer program within the scope of its activities would have been considered a trespasser into the realms of curative medicine. Today practically all health departments are being urged to include cancer in the public-health field, and the medical profession is endorsing such requests. This changed attitude is further evidence of the co-operation and co-ordination of medical practice and public health, indicating that curative and preventive medicine are becoming more closely linked together, with a tendency to eliminate any clear line of demarcation between them.

Previously governments have given tuberculosis a prominent place in all public-health endeavours, but it is now found necessary to focus more attention on cancer, which occupies second highest place in our death rates.

Some fifteen years ago a special investigation of deaths from cancer in Saskatchewan was made by the Division of Vital Statistics, covering the years 1905 (the year of the inauguration of the province) to 1926 inclusive. This survey brought to light important information as to the alarmingly steady increase in death rates from cancer. For instance, the death rate in 1905 was 8.8 per 100,000 population; in 1909—12.8; in 1914—23.3; in 1919—32.0; in 1924—40.9; in 1926—45.1. The death rate in 1941 was 90.9. During the same period the mortality rate from cancer per 1,000 deaths, all causes, rose from 25.6 to 56.0. The survey indicated the deaths by age periods and sex, the duration of the illness before death, the cases hospitalized, and the birthplace of those who died from cancer. This survey was a means of bringing the cancer problem before the general public and the medical profession, and formed the basis for the action taken in 1930 by the Saskatchewan Government in instituting measures for the diagnosis, treatment and prevention of the disease.

In 1929 the Saskatchewan Medical Association appointed a committee to investigate facilities available in the province for the treatment of cancer, and made a report to the Minister of Public Health recommending, for modern and efficient treatment, more co-ordination of existing facilities and an ample supply of radium.

Legislation dealing with cancer was first passed in March 1930 and became law in May of the same year. The Act provided for the appointment of the Saskatchewan Cancer Commission. The following indicates some of the powers delegated to it, and the action taken:

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(1) *To institute enquiries and collect facts and statistics relating to the incidence of mortality from and treatment of cancer.*

This was accomplished by making use of information contained in vital statistics reports of the Department of Public Health and by communicating with various places where special treatment centres were in operation, particularly in the United States. A questionnaire was also sent to all practising physicians in the province to ascertain the number of cancer cases being treated by them. The information obtained indicated that some 1,500 cancer cases were under treatment at that time.

In 1930 the Commission applied for affiliation with the British Empire Cancer Campaign. This organization is closely associated with the most outstanding cancer authorities all over the world and particularly within the Empire. Its annual reports include statements from the various institutions under its patronage and the latest reports of all research committees.

In September 1933 a regulation was passed making provision whereby all cases of cancer must be reported to the Commission by physicians and hospitals.

(2) *To disseminate information to aid in the control and treatment of cancer.*

To accomplish this, the Cancer Committee of the Saskatchewan Medical Association undertook to keep the problem constantly before the various district medical societies, and promoted discussions at the annual meetings of the parent associations.

In August 1933 at the time of the annual convention of the Provincial Medical Association a special cancer conference was held. Dr. Joseph Colt Bloodgood, Professor of Surgery at Johns Hopkins Hospital, Baltimore, addressed the Association. He also addressed the Dental Association, several service clubs, and one public meeting, and conferred with the Commission's clinical staffs.

In 1935 a cancer film entitled "Rays of Hope" was completed for showing in theatres and at public meetings. In 1942 a new film entitled "That They May Live" was produced.

(3) *To provide for the establishment of consultative diagnostic clinics for the diagnosis of cancer.*

The Commission established two consultative diagnostic clinics, one at Saskatoon to serve the northern part of the province, and one at Regina to serve the southern portion. At first these clinics were staffed with a part-time personnel, consisting of an internist, surgeon, radiotherapist and pathologist, nominated by the medical staff of the hospital for a one-year period. This rotating service gave a number of the physicians on the hospital staff the opportunity of becoming more familiar with the diagnosis and treatment of cancer. This plan was adequate for only a short time, after which it was considered advisable to make permanent appointments to the clinic staff, which is the system now being followed.

The number of patients referred to the clinics increased to such an extent

that it soon became necessary to appoint an internist as director of medical services, and a radiotherapist to direct the Regina Clinic and supervise all radiological services in both clinics.

The Cancer Committee of the Saskatchewan Medical Association in its report for 1930 recommended the centralization of clinic facilities in this province. This policy has made it possible to take full advantage of the heavy capital expenditure necessary for equipment of this kind. It also provides for the development of a more highly trained clinical staff by virtue of the wider experience gained in the centralization of clinic services.

General practitioners are considered our first line of defence in any attempt to deal with cancer, but the cases encountered in general practice would undoubtedly be limited, while rural practitioners would probably have not more than one or two cases during the course of a year. They therefore appreciate the opportunity of referring suspected cases of cancer to a clinic which deals entirely with the disease and is staffed by those who have had the advantage of specialized and post-graduate training in cancer work. It is well recognized that cancer control is not a one-man job, but requires the co-operation of the patient, family physician, surgeon, pathologist, radiologist and internist.

(4) *To provide clinics for the treatment of cancer by radiation therapy and electro-therapeutics.*

Treatment clinics, in so far as deep X-ray and radium are concerned, have been established in association with the consultative diagnostic clinics. Each clinic is equipped with a 400 K.V. and a 220 K.V. X-ray machine, as well as an ample supply of radium in various-sized needles.

After consultation with the entire clinic staff, the radiotherapist outlines and supervises the X-ray or radium treatment decided upon. Since the Government owns the radium and feels that it should only be used by those with special knowledge and training, radium is handled only under the direction of the clinic radiotherapists.

(5) *To obtain a supply of radium.*

The Government purchased some 600 needles containing various amounts of radium from 0.5 mgm. to 13.3 mgm.

An emanation plant was built at the University of Saskatchewan and placed under the supervision of the professor of physics, and this plant produces more than sufficient radon for our own use. The surplus not required for our two clinics may be purchased by governments, universities, recognized cancer organizations or certified radiotherapists outside the province.

(6) *To provide facilities for the diagnosis and treatment of cancer for all patients.*

Cancer services are not free* and patients in a position to pay for diagnosis

*At the 1944 Session of the Saskatchewan Legislature, provision was made under The Cancer Control Act, whereby all patients who are residents of Saskatchewan for at least six months immediately prior to making application for admission to a clinic shall be entitled to care and treatment at the expense of the province. This legislation is to become effective on a date to be named by proclamation of the Lieutenant Governor in Council, and it is expected that it will be put into effect as soon after May 1, 1944, as possible.

and treatment are required to do so. In case of indigency, the council of the municipality in which the patient has established residence must assume payment of the account, as for any other disease. Fees are as reasonable as possible in order that no patient need go without treatment.

In any attempt to control cancer by clinics, recognition must be given to the relationship between the patient and the doctor, and the referring doctor must be kept informed of the findings of the clinic staff each time the patient appears at the clinic. Sympathetic and regular follow-up in each case is essential in order that the clinic staff may know the result of treatment and be satisfied that there is no evidence of spread of the disease. Where there is such evidence, further treatment may be instituted before the condition has developed beyond control. Each patient's file should be a complete record of the case until at least five years have elapsed or until the time of death. Standardization of the forms for all of Canada would be of value to facilitate comparisons in evaluating any particular form of treatment. Such data should add greatly to our general knowledge of cancer.

During the ten-year period January 1, 1932, to May 1, 1942, there were 8,897 patients, including cancer, pre-cancer, and non-cancerous, admitted to the clinics.

Education of the public is carried on by distribution of literature, public lectures, moving pictures and a series of slides indicating the results of treatment given at the clinics. In the education of the profession, moving pictures, slides, and papers on cancer have been used, and physicians have been encouraged to attend the clinics with their patients.

HEALTH INSURANCE

In keeping with the proposed policy outlined in the draft bill for health insurance, whereby certain sums are to be set aside for postgraduate training of public-health personnel, I am of the opinion that financial provision should be made for the training of personnel in carrying out all phases of cancer control and treatment, and for cancer research under appropriate auspices.

We in the Province of Saskatchewan are of the opinion that the control, diagnosis and treatment of cancer should be placed on a basis similar to that proposed for the treatment of mental diseases and tuberculosis, and, further, that our cancer-control program should be based upon a policy very similar to that which we are conducting in the control of tuberculosis. We believe, also, that grants-in-aid for cancer services should be made by the federal government, as has been proposed in connection with mental and tuberculosis work, and that the amount to be paid should be proportionate to grants for the other programs. I do not consider that cancer should be left in the undeveloped field of health insurance, as it is a highly specialized service requiring special training and experience in diagnostic, radiological and surgical care, if we are to provide the cancer patient with the best that medical science has made available.

Recent Trends in Nutrition

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THIS discussion is intended not to review recent advances in nutrition but to present opinions on trends which have been prominent in the past few years. It seems advisable to take stock of the present position of nutrition in relation to public health, more particularly in Canada.

A concept which has had a marked effect upon nutritional thought in recent years has been that there is a wide-spread prevalence of sub-clinical nutritional deficiency. Many people have been thought to secure food intakes which are sufficiently good to prevent actual deficiency diseases but which could not be rated as adequate on the basis of currently approved standards. It has been said that persons included in this category do not enjoy a full measure of health and may be below par mentally or physically. These claims were initially derived from evidence secured by dietary surveys and from work on animals, where sub-optimal states can be easily produced. As this concept developed, many workers sought to obtain diagnostic methods which could be used to detect the presence of sub-clinical deficiencies and it became the fashion to carry out determinations of amounts of various vitamins in specimens of blood and urine. Several physical procedures, such as biomicroscopic examinations of the eye, tongue or gums, were claimed to be of diagnostic value. It is advantageous to consider the validity of such claims, especially since the results have been used for unnecessarily exaggerated statements about the prevalence of malnutrition. Such statements have been offered as arguments for the wide-spread use of vitamins, as in the enrichment of flour and other foods. They have been used as evidence of iniquities in the present social order.

During the past few years some six surveys of food consumption have been made on groups of Canadian people, mostly in low-income classes in cities. The general procedure was to secure a record of food intake for a week, to calculate the amounts of various constituents, and to determine the adequacy of such amounts in terms of a standard assumed to be a picture of optimal nutritional requirements. In this way it was found that a certain percentage of the persons studied had less than 70 per cent of the optimum standard for thiamin, to use one example. These people were then said to have a deficient supply of thiamin. I plead guilty to having had considerable responsibility for such interpretations. The results of these surveys, and of other investigations, have been widely quoted and have given rise to such statements as one which appeared in a recent editorial in a newspaper, that 60 per cent of the Canadian people are malnourished. More recent evidence warrants the careful re-

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consideration of the results of these surveys and of others which have been made in Canada and elsewhere.

There are a number of factors which affect the validity of results of dietary surveys. It might well be asked whether a food record for a given week is a true picture of an individual's food habits. One could easily understand that the intake of vitamin C varies greatly from season to season. A person may have a small supply of this vitamin in April and a much greater supply in July or September when fresh fruits and vegetables are readily available. Having secured a record of food intake, it is necessary to calculate the amounts of various food constituents. Tables of food composition used for this purpose give average values for a few analyses and food composition varies over a wide range. The actual amount of a constituent received by the subject may be considerably different from that calculated. Unfortunately, it is not possible in most surveys to do analyses of samples of the food actually used. When the amounts of various constituents have been calculated, the results have little meaning unless they are assessed in terms of adequacy. This is done by comparing the amounts allegedly received against a standard of adequacy. Obviously the evaluation of the results depends upon the choice of standard. A given intake may be adequate or inadequate depending on the standard which is used for comparison. The validity of the interpretation of survey results, so far as adequacy is concerned, is thus conditioned by the validity of the standard.

The yardstick which has been used in recent surveys to judge adequacy has been the Table of Recommended Allowances adopted by the Food and Nutrition Board of the United States and approved for use in Canada by the Canadian Council on Nutrition. It should be recognized that this table of allowances was not designed as a rigid standard but was stated to be a compilation of recommended allowances for guidance in planning diets optimal for health. Nevertheless, this table, because it has been given authoritative sanction, has been widely regarded as a standard, and in some quarters as an infallible one. That it was not intended to be so used has, unfortunately, not prevented its being held to be the most suitable standard for assessing nutritional adequacy. Since the correct interpretation of the results of dietary surveys depends upon the validity of this, or somewhat similar standard, it is imperative that we examine the real value of the standard.

It should be recognized that there is a definite scarcity of scientific evidence of a number of human nutritional requisites, particularly for the vitamins. A great deal of work has been done upon energy requirements and one might feel more confident in recommended allowances for calories than for minerals and vitamins. Even in the case of calories there are some doubts, however. Youmans and Patton have reported calorie supplies much below recommended allowances without clinical evidence of harmful effects. The recommended amount of protein for a man is given as 70 grams per day. This has been a widely accepted figure for some years. It is debatable whether a person who receives 45 grams of protein per day should be considered to be

undernourished. There is evidence that people can remain healthy on as little as 30 grams per day. It would be desirable, probably, for a man to have 70 grams of protein a day; it is doubtful if this amount is essential for health. The recommended allowance for iron is 12 mg. per day for adults. If one examines the evidence, one finds very few data in support of this amount for men. The statement has been made that men, in the absence of haemorrhage, can maintain health on a diet practically devoid of iron. There is no evidence that an intake of 6 mg. per day would cause malnutrition in men. Estimates for riboflavin were derived largely from experiments on dogs and it is by no means certain that the riboflavin requirements of humans can be calculated on a weight basis from values secured with dogs. The table of allowances gives a false sense of accuracy for all of the vitamins. To give one instance: the thiamin requirement for a three-year-old child is given as 0.6 mg., for a five-year-old as 0.8 mg. There is no scientific evidence to support such a distinction. In the case of ascorbic acid the recommended allowances are probably much greater than is necessary and imply, again, unjustified accuracy. The table provides 75 mg. of ascorbic acid for men and 70 mg. for women. It is difficult to find data to support this difference. Are people who secure 50 mg. of ascorbic acid per day to be considered undernourished? One would hesitate to think so in view of a great deal of evidence to the contrary. It has been estimated that people in Great Britain are receiving 30 mg. of ascorbic acid, or perhaps less, per day. There is little evidence of scurvy and it has been stated that the general level of health in Great Britain has improved during the war.

It is apparent that recommended allowances of various nutrients are, in many cases, surmises based on comparatively little scientific evidence and that some, at least, of the recommended allowances are unnecessarily large. It should, however, be made entirely clear that these recommended allowances were not designed to be criteria of the state of nutrition but rather to serve as guides in providing optimal supplies of food. A discussion of this has been made necessary, in the present instance, because of the use of these recommendations to evaluate dietary adequacy. Because of the lack of scientific evidence it is not possible, at present, to assemble a precise standard of adequacy. Until such information is available it will be necessary to interpret survey results with considerable caution. Obviously there is an urgent need for research upon human nutritional requirements.

There have been a number of attempts to find diagnostic procedures which can be used to detect sub-clinical deficiencies. Few, if any, of the procedures have met with wide acceptance. Some workers have placed considerable reliance in the measurement of vitamins in blood and urine. The procedures for such determinations are probably satisfactory, but how shall the results be interpreted? A low content of ascorbic acid in blood plasma may indicate a small intake of this vitamin in the preceding day or two, but there is no proof that it shows that a deterioration in health has set in. For a while a great deal of confidence was placed on the use of corneal vascularization as an indication of riboflavin deficiency. Considerable evidence has now accumulated

that this diagnostic test is not nearly so reliable for this specific purpose as was thought. An extensive review of the various tests which have been recommended leaves the impression that it is difficult to demonstrate the presence of sub-clinical deficiencies at the present time by such means.

The uncertainty of many existing diagnostic tests cannot be used as proof that sub-clinical nutritional conditions do not exist. The lack of precision shows that research upon diagnostic procedures is greatly needed. While present methods of diagnosis do not give definite evidence of poor nutrition, other types of evidence do provide proof of the existence of sub-clinical deficiency. The work of Ebbs and his associates, to cite only one example, showed that the health of expectant mothers can be improved by alterations in the diet. The poorer state of the mothers in the control group, who were living on customary supplies of food, is incontrovertible evidence that such dietaries are not optimal. There is a very large amount of data which proves that improvement in health results from a bettering of food habits. By the intelligent use of modern nutritional knowledge, authorities in Great Britain were able to plan and to put into operation rationing programs which have actually given an improvement in nutrition and in health, despite the hardships imposed by war.

It should be made clear that the nutritional surveys which have been conducted have furnished some valuable results. They have clearly indicated the causes which operate in Canada to bring about poor nutrition. Low-income families are handicapped in securing proper supplies of food by economic conditions. In all classes a lack of nutritional knowledge and some indifference have prevented families from securing the food supply desirable for health. The surveys have provided abundant proof of the prevalent need for nutrition education.

Leadership in nutrition education can best be undertaken by health officers. There has been in the past few years a wave of enthusiasm for nutrition and an impression has frequently been given to the public that an adequate diet will prevent all ills. A medical officer of health would not be guilty of making such a misleading statement. Health officers recognize that a complete health program must include nutrition but they also know that this subject should not be given disproportionate emphasis. Real and lasting progress in nutrition education can be secured only by a program which is based on proven facts and which is planned by those who appreciate the whole picture of the factors which influence health.

The present situation in nutrition in Canada is a challenge to public-health authorities to assume their rightful place as leaders in the field. By so doing they can prevent misleading statements being given to the public and they can ensure safe and sane progress in improving nutritional conditions by giving this subject suitable emphasis in public-health programs.

The Survival of *E. Typhosa* in Cheddar Cheese Manufactured from Infected Raw Milk

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CHEESE has been incriminated in many outbreaks of food poisoning and food infections. Tanner (1) has dealt extensively with the early outbreaks and experimental studies of infections and intoxications ascribed to cheese and has prepared an excellent bibliography. Among the organisms most commonly associated with cheese-borne infections are various members of the *Salmonella* group such as *Salmonella schottmüller* (para B), *Salmonella suis-pestifer*, *Salmonella aertryke* and, in addition, *Shigella dysenteriae* Sonne and *Eberthella typhosa*. Cheese-borne food poisoning has been attributed to the toxins of *Clostridium botulinum* and *Staphylococcus*.

Probably the most important pathogen which is likely to be carried by cheese is *E. typhosa*. Since any methods which may be employed to prevent infection by *E. typhosa* would, in all probability, be equally effective against similar pathogens which may accidentally contaminate cheese, it seemed reasonable to confine these experimental studies to *E. typhosa*.

In 1923, Rich (2) reported an outbreak of typhoid fever involving 51 cases and 4 deaths where the vehicle was a full cream cheese. Wade and Shere (3) (1928) described an epidemic of 29 cases of typhoid fever and 4 deaths attributable to American Cheddar cheese. Dolman (4) has stated that in Canada, between 1932 and 1939, there were 6 known cheese-borne outbreaks of typhoid involving 760 persons and 71 deaths. Dolman claimed that the cheese involved was the Cheddar type manufactured from raw milk. The St. Maurice Valley epidemic of 1932 (5) was probably the outstanding example of a serious epidemic of typhoid fever in which fresh Cheddar cheese was the vehicle. From this outbreak alone 627 cases were reported. More recently Bowman (6) (1942) has reported three epidemics involving 100 cases of typhoid fever ascribed to the eating of contaminated cheese. The epidemiological study of these three epidemics has shown that the cheese most likely became infected through a contaminated raw-milk supply, from a farm operated by a typhoid carrier. Evidence was presented indicating that the cheese remained dangerous for at least 80 days.

In the late nineteenth century, Heim and Rowland reported that they failed to find typhoid organisms one or two days after inoculating them into cheese. Pfuhl (1902) failed to agree on the longevity of typhoid in cheese and showed that he could isolate these bacilli from infected cheese in 24 but not in 26 days. Even after Pfuhl's work Lumsden (7) (1909) claimed that "the time required for the ripening of cheese makes the chances of infection from this

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dairy product certainly very slight" but he failed to specify the length of the ripening period. As recently as 1927 Zinsser (8) said that *E. typhosa* and other non-sporeforming pathogenic germs cannot survive for any length of time in cheese. Neither author specified the best ripening conditions for shortening the life of the pathogens.

Wade and Shere used a commercial process and manufactured three-quarter-pound experimental Cheddar cheese. These authors inoculated the milk used to manufacture the cheese, thus simulating, as far as possible, factory conditions. They were able, in 2 cheese out of 18, held at 60°F. (15.5°C.), to isolate *E. typhosa* after 34 and 36 days. The cheese were not large enough to permit of further sampling and therefore the total survival time of the organisms could not be determined. They also presented epidemiological evidence indicating that *E. typhosa* probably survived in a commercial cheese for 63 days at 60°F. (15.5°C.). Ranta and Dolman (9) showed the survival time of *E. typhosa* in ground Cheddar cheese to be one month at room temperature and 17 weeks in the refrigerator. From all these reports it is noted that Wade and Shere are the only authors who have attempted to adhere closely to commercial manufacturing conditions when investigating the survival of *E. typhosa* in Cheddar cheese.

In this study the primary condition was that the best commercial process should be used and that small commercial-size Cheddar cheese of high quality must be manufactured. To that end the advice of dairy specialists was obtained and several vats of normal Cheddar cheese were made and the process standardized. Each vat of milk was made into two 10- to 12-pound cheese so that after the normal ripening period of two weeks at 58-60°F., one cheese could be kept at this temperature and the other stored at 40-42°F., for comparison. Since milk is the most probable source of infection in cheese, all cultures of *E. typhosa* were added to the milk. The full details are set forth below.

METHOD OF MANUFACTURE

Cheese was made between April 27 and June 18, 1942. Altogether 14 vats of milk were processed, each vat yielding two 10- to 12-pound cheese. The first 3 vats (6 cheese) were run without the addition of typhoid organisms. These were regarded as normal controls for grading purposes. Three different types of *E. typhosa*, identified as phage types C, F, and M, were used to infect the milk. These cultures were all smooth Vi forms; two of them were of recent isolation. The other (phage type F) was the rejuvenated Rawlings strain.

Approximately 240 pounds of high-quality raw milk were used for each day's manufacture. A small experimental cheese vat was employed. The temperature of the milk was raised to 86°F. (30°C.) and about 2 per cent of starter, with an acidity of 0.70 per cent, was added. Rennet was added (3¼ ounces per 1,000 pounds of milk) when the milk showed an acidity of 0.20 per cent. Just prior to the addition of the rennet the typhoid culture was thoroughly mixed into the milk in varying quantities to produce final counts

of 1,000 to 600,000 per cc. of milk. The count was determined on the typhoid culture and then calculated in terms of the numbers of *E. typhosa* per cc. of milk in the vat. No coloring matter was used and immediately after mixing in the rennet the milk was allowed to clot. Cutting commenced when a finger inserted vertically and raised in a horizontal position showed a clean linear break of the curd. At this point the curd was cut with standard curd knives into small cubes. The interval from setting to cutting ranged from 23 to 30 minutes. Contraction and firming of the curd cubes was achieved by slowly increasing the temperature, 2° for each 5 minutes for the first 10 minutes and then more rapidly for the next 20 minutes, to a final temperature of about 102°F. (38.9°C.).

The titratable acidity checked at the time of cutting varied between 0.13 and 0.15 per cent. Acidity was tested at regular intervals until it reached 0.19 to 0.20 per cent when the whey was drained off and the curd piled. Usually the acidity ranged between 0.29 and 0.32 per cent by the time this operation was finished. The next process, the cheddaring of the curd, was accomplished by cutting, piling, and repiling. This gradually squeezed out the whey until the curd could be pulled apart into layers like the breast meat of chicken. It was then put through the curd mill. The resulting small uniform pieces were salted, using $2\frac{1}{4}$ pounds of salt for every 1,000 pounds of milk. The salted curd was turned at intervals. After some 45 minutes to one hour it was placed in hoops and pressed for 48 hours. The new cheese were held for 14 days at a ripening temperature of 58-60°F. (14.4-15.5°C.). They were then washed with a sodium propionate solution, waxed and numbered. After this one cheese of each vat was transferred to storage at 40-42°F. (4.4-5.6°C.) while the other was held at the ripening temperature (58-60°F.). Cheese with the letter "A" after the number are those which were held at the high temperature (58-60°F.).

SAMPLING

Samples were bored out weekly, care being taken to keep at least one-half to three-quarters of an inch from the edge of the cheese. Following each boring the hole was filled with hot paraffin to prevent mold growth. A one-gram portion from the boring at one end of a cheese, together with a similar portion from the other end of the same cheese, was macerated with the aid of a little sterile sand. Later, as the cheese ripened and dried, maceration was possible without the sand. Dilutions were made in sterile saline and plated directly on MacConkey's agar. In addition, 1 cc. of each dilution was transferred to tetrathionate broth as an enrichment medium. As the cheese aged it was found that the number of viable *E. typhosa* fell off rapidly and it became necessary to examine larger quantities; therefore, 5 grams of cheese from a single boring were ground directly into 45 cc. of tetrathionate broth. Subsequent dilutions were made in the same medium. All cultures of *E. typhosa* isolated from the cheese were tested serologically for "O" and "Vi" antigens as an additional check on the identity of the organism. A cheese was con-

sidered to be free of viable *E. typhosa* when this organism could not be isolated after approximately two months' testing at weekly intervals.

On three different dates (November 25, 1942; January 23, 1943; and April 13, 1943), as shown in Table 1, the titratable acidity of each infected cheese was determined. One reading was made on the normal cheese. The method of calculating the acidity was that used by Van Slyke and Price (10).

TABLE 1

VIABILITY OF *E. typhosa* AND ACIDITY OF CHEESE STORED AT TWO TEMPERATURES

Cheese No.	Date of Mfr.	No. of <i>E. typhosa</i> per cc. milk	Phage Type of <i>E. typhosa</i>	Acidity			Viability in days
				25.11.42	23.1.43	13.4.43	
Storage Temperature 40-42°F.							
13	21-5-42	16,000	F	1.7	2.0	2.0	301
15	26-5-42	20,000	F	1.8	1.8	2.4	252
17	28-5-42	22,000	F	1.5	1.9	2.2	322*
21	4-6-42	600,000	F	1.7	2.3	2.1	182
27	18-6-42	6,000	F	1.3	1.9	1.9	210
9	14-5-42	8,000	M	1.8	1.9	2.1	336*
23	9-6-42	2,000	M	1.4	1.8	2.6	308*
25	16-6-42	2,000	M	1.5	1.9	1.9	301*
11	19-5-42	2,000	C	1.6	2.1	2.0	308
19	2-6-42	1,000	C	1.7	1.6	2.3	315*
Storage Temperature 58-60°F.							
13A	21-5-42	16,000	F	2.2	2.7	2.0	49
15A	26-5-42	20,000	F	2.0	2.3	1.9	42
17A	28-5-42	22,000	F	1.9	2.4	1.9	196
21A	4-6-42	600,000	F	2.2	2.6	2.2	56
27A	18-6-42	6,000	F	2.1	2.7	2.1	35
9A	14-5-42	8,000	M	2.3	2.8	2.7	196
23A	9-6-42	2,000	M	2.1	2.3	2.0	126
25A	16-6-42	2,000	M	2.2	2.3	2.3	91
11A	19-5-42	2,000	C	2.0	2.6	2.1	49
19A	2-6-42	1,000	C	2.0	2.0	2.4	140

**E. typhosa* was isolated from these cheese on the last day of the experiment after which it was no longer possible to obtain fair samples.

RESULT AND DISCUSSION

All of the cheese were graded by the same official cheese grader of the Dominion Government Department of Agriculture. The control cheese were all graded first as to quality and texture, thus confirming the first condition of the study in that cheese of commercial quality was made.

The experimental cheese, because of the resultant risk, were not graded until 8 months after manufacture and at that time out of the 20 cheese, 8 were below third, 10 in third, and 2 in second grade for flavour; 5 were below third, one in third, 9 in second and 5 in first grade for texture. It seems appropriate here to quote from the grading report prepared by a dairy specialist. It follows:

"It should be emphasized that the grades of the experimental cheese reported are in no way a fair evaluation of the quality of the cheese at time of manufacture or at the end of two weeks when cheese are offered for commercial grading.

"The lowering of grade both in flavour and texture may be accounted for by the fact that both ends of all the experimental cheese had been bored on numerous occasions. Cheese held or stored under such conditions naturally mature differently from unbored cheese due to the introduction of air and the setting up of aerobic rather than anaerobic conditions within the cheese, mild contamination within the cheese, and excessive losses in moisture. In view of the fact that all of the control cheese remained in first grade it may be necessary to attach more importance to the controls than to the grades of the bored cheese."

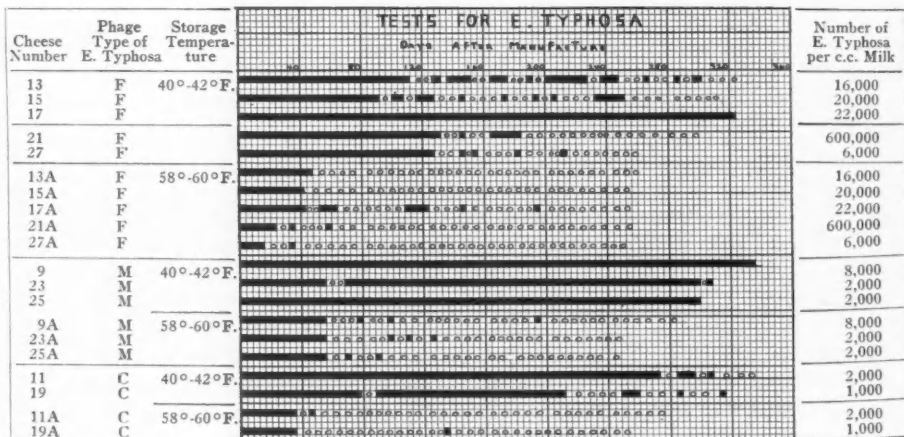
TABLE 1A
ACIDITY OF NORMAL CONTROL CHEESE

Cheese No.	Date of Manufacture	Acidity April 13, 1943
1	27-4-42	2.3
2	27-4-42	2.3
3	30-4-42	2.2
4	30-4-42	2.2
5	5-5-42	2.4
6	5-5-42	2.6

The essential data are presented in Tables 1 and 1A and Diagram 1. From these data it is obvious that there was a significant difference in the viability of *E. typhosa* in cheese stored at 40°-42°F. as compared with those stored at 58°-60°F. (See Table 1, column 8.) At the lower temperature there were 5 cheese (noted with an asterisk, Table 1) which retained viable organisms up to and including the last test conducted. Seven out of these 10 cheese retained *E. typhosa* for more than 300 days. Since each batch consisted of 2

DIAGRAM I

To Show the Viability of *E. Typhosa* in Cheese Stored at 40°-42°F. and 58°-60°F.



All Tests Conducted at Weekly Intervals

■ Positive
○○○ Negative

cheese, both of which were ripened under identical conditions and then stored at two different temperatures, the comparisons between these two conditions are significant. It will be noted that cheese stored at 58-60°F. did not retain *E. typhosa* as long as the others. Further, it is evident from Diagram 1 that *E. typhosa* died more rapidly in cheese stored at the higher temperature and although isolations were occasionally made after a prolonged period there were many negative tests between positive ones. In general, it might be stated therefore that under the experimental conditions most of the *E. typhosa* were dead in cheese stored at 58-60°F. after a storage period of three months, whereas similar cheese stored at 40-42°F. retained viable *E. typhosa* for at least six months and in the majority of cases (7 out of 10) for 10 or more months.

Despite the fact that all of the experimental cheese graded much lower than the controls, attention is drawn to the fact that both high and low temperature cheese were treated similarly and were also bored an equal number of times. Therefore, the high temperature cheese must be considered the safer.

There appears to be no difference in the longevity of the infecting organisms when small or large inocula were used. Cheese 21A was made from milk containing 600,000 *E. typhosa* per cc. and retained some of these organisms for 56 days, while cheese 17A was made from milk containing 22,000 *E. typhosa* per cc., but they survived at least 196 days.

There may be a difference in the viability of different cultures of *E. typhosa*. In the case of the three cultures used it will be noted in Table 1, column 8, that only one out of five cheese infected with phage type F retained viable organisms to the end of the study, while with phage type M all three retained viable organisms to the end.

It was expected that the acidity of the cheese might have played some part in the death of *E. typhosa* and, although it is true that the cheese held at high temperature developed acid more quickly than those held at low temperature, there does not seem to be any correlation between acidity and viability of inoculated bacteria in different cheese.

At the conclusion of the study, all of the last cultures isolated from each cheese were tested for identity by serological and biochemical methods. It was found that all the cultures of *E. typhosa* recovered were in the smooth Vi phase and none of the strains had reverted to the rough or W form. This fact may be of considerable epidemiological significance.

ACKNOWLEDGMENT

The authors wish to acknowledge with grateful thanks the co-operation and advice of Dr. E. G. Hood, Chief, Dairy Research; C. A. Gibson, Creamery Manager; and T. S. Hicks, Senior Dairy Produce Grader, all of the Department of Agriculture, Ottawa.

Since this article was written, Gauthier and Foley (Canad. Pub. Health J., 1943, 34: 543) have reported an epidemic of typhoid fever which occurred

in the county of Champlain, P.Q., in the fall of 1941. An epidemiological investigation of the outbreak shows that 40 cases of typhoid fever were reported between September 1 and 30, 1941, and that Cheddar cheese manufactured during the latter part of August and the first part of September, 1941, was the vehicle.

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Canadian Journal of Public Health

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UTILIZING MORTALITY RECORDS AND EXPERIENCE

WHETHER or not health and medical services of the future are provided by an organization different from that obtaining today, there are changes which are urgently needed, are fundamental to improvement in the state of public health, and are as applicable to one type of organization as to another. Recognition of the necessity for change does not imply criticism of the past—such criticism is as useless as it is distasteful. Today's problems are ours and the volume of death occurring before its due time is one of these problems. While any mention of mortality today may seem incompatible with prevailing propaganda and promotion of positive health, incompatible even with the optimistic views of prevention too freely expressed, the fact that over 60 per cent of all Canada's mortality is supplied by those under 70 years of age constitutes in itself a fully valid reason for a thorough consideration of all factors involved, of which the death certificate is but one.

That volume of untimely mortality cannot be readily wiped out. In fact, many generations and possibly aeons will pass before the problems indicated by the death certificate can be disregarded. In cursory examination of the causes of mortality in younger and mid-life age groups, it is at once apparent that for many of them effectual control measures are not known; for some, certain remedial measures are known but are not generally applied or are only partly effectual.

How the death certificate could serve better in attacking this problem of mortality can perhaps be suggested by a few examples. For instance, when acute appendicitis develops, the victim may recover or die. Medical science cannot influence materially the incidence of appendicitis, but it can influence and does influence very materially the outcome. If adequate treatment is given in time, the chance of recovery, while not complete, is high; if a violent purge is used or adequate treatment delayed, the chance of recovery drops. Which of these factors—home medication, lack of medical attendance, lack of diagnostic facilities or facilities for adequate treatment—or what other factor predominates or is operative in the over 1,000 deaths that are charged to appendicitis in

Canada in a year and through which appendicitis ranks high as the cause of death in certain important age groups? The death certificate gives no information whatever regarding any such contributory factor to which the death was really due rather than to appendicitis. So too, in the deaths from rheumatic fever and heart disease in the younger age-groups: Did the disease develop under conditions associated with poverty, bad physical environment, excessive exposure to the elements, or malnutrition? Was it related to another case? Did it follow any recognized infection? Was the progress of tuberculosis to death rather than to recovery dependent on some factor which might have been remedied, such as economic condition, lack of medical attention, of bed accommodation, etc.? Was the death from diphtheria due to failure to use established prophylaxis, and if so, why? Or failure to have adequate treatment, and if so, why? In the accidental death, was waywardness of the victim the contributory factor, or was it a lack of protection against some recognized hazard in the environment? Was the death from diarrhoea and enteritis in infancy due, in reality, to economic conditions, to poverty, lack of household facilities conducive to cleanliness, lack of intelligent care and nursing, of proper diet, of medical attention? Surveys have shown that factors such as those mentioned and others—sometimes one, sometimes another—are operative in the chief causes of death in young and mid-life. Such surveys are valuable, but they do not give the complete picture and the findings of one survey may not be applicable in another set of conditions. Why should the survey not be constant and complete? If untimely mortality is to be postponed as it should be, the factor or factors operating in every case of untimely death should be, if possible, identified and recorded, not just to supply data for tabulation and report at some future time, but to be used there and then in preventing a repetition of death under similar circumstances and to provide, in the later analysis, a sound basis for policy and practice. This is not a new suggestion. It was probably very old when John Graunt emphasized the necessity for it 200 years ago. Hirsch carried it further in 1870, but little enough notice was taken of his work. Ryle has re-emphasized it lately, under the name of "social medicine," and Topley, in his Linacre lecture in 1940, makes a plea for thus utilizing the capabilities, opportunities and experiences of the general practitioner, in adding to our knowledge in medicine.

Although there can be no doubt as to the necessity for obtaining such information regarding contributory conditions and circumstances, not as so-called "social medicine," nor as epidemiological findings, but as common-sense scientific medicine, there is a question as to how it should be obtained, whether in a confidential report from the medical attendant to a competent local medical registrar or an enquiry by such registrar. The need for the registrar's having medical professional qualifications is obvious. There can be no question regarding the spirit in which the information should be obtained. If any suggestion of criticism of the family, patient, or the medical attendant were implied, the method would defeat its objective. There should be no possibility of any tinge of criticism or of consequent embarrassment, the only reason for collecting

such data being to correct existing conditions that permit or produce mortality. It would not be anticipated that the information obtained would be completely accurate and free from opinion and prejudice. Much of it would be based on opinion and no doubt in some instances the opinion would be wrong. But that is only the reflection of human limitations and human frailties—inevitable as death itself and inherent in most records. It is no reason for not obtaining the data.

The provision of the set-up for obtaining and utilizing such essential information is fundamental to any medical or public health service whether as it is today or as some form of "state medicine" in the future. The form which such a set-up might take should be submitted for consideration to a competent committee, representative of public health, medicine, and preventive medicine throughout Canada.

CANADIAN PUBLIC HEALTH ASSOCIATION

WARTIME CONFERENCE

November

1 • 2 • 3

Royal York Hotel

T O R O N T O

ONTARIO HEALTH OFFICERS ASSOCIATION

Venereal Disease Control

REGIONAL CONFERENCES

AT the National Venereal Disease Control Conference, held in Ottawa on December 6th to 10th under the auspices of the Department of Pensions and National Health, Lt.-Col. Harold Orr, O.B.E., V.D., Director of the Division of Social Hygiene for the Department of Public Health of Alberta, outlined the place of regional conferences in the control of venereal disease:

"The efficiency of venereal-disease control depends on the co-operation of people in many spheres of activity. In order that all the participants in the program may be well informed, frequent conferences are necessary. Conferences may be local, provincial, regional or national. In Canada there have been three regional, a few provincial and numerous local meetings, but this is the first national venereal-disease control conference. It might have been better to have a national conference first to determine broad policies and to initiate regional meetings.

"A *local* conference should bring together everybody in any way interested in the problem of venereal diseases. A *provincial* conference should include all of the provincial, municipal and rural medical officers of health, the head of the provincial police force and some of his officers, all chiefs of police with members of their morality squads, Crown prosecutors, magistrates, officers of the Attorney-General's department, venereal-disease control officers of all grades, laboratory workers and representative officers of the Navy, Army, Air Force and the Department of Pensions and National Health.

"I presume that we are all agreed as to the value of a *regional* conference. A general exchange of ideas, techniques and problems such as is made possible in a round-table discussion among the staffs of three or

four provincial venereal-disease control departments and their associated law-enforcement agencies is not only enlightening and stimulating, but makes for a smoother interprovincial co-operation in venereal-disease control. If the idea is adopted, it will be necessary to divide Canada into conference regions, and for each region a committee should be appointed at this conference. The four western provinces already constitute a region and have held two conferences.

"Each regional committee, meeting this week at the call of the convener, should decide the time and place of its conference, or it may be desirable for some regions to settle these matters later by correspondence. The venereal-disease control officer of the province in which it is to be held is the logical person to organize the conference, but the invitations should be sent from the office of the Minister of Health. The following should be invited from each province in the region: The Minister of Health, the Deputy Minister of Health, the Attorney General, the Deputy Attorney General, the head of the provincial police force and some of his senior officers concerned with suppressing prostitution, the chiefs of police of the cities, the Crown prosecutors of the larger cities, venereal-disease control officers, representatives of the medical services and provost corps of the Navy, Army and Air Force and officers of the Department of Pensions and National Health, a representative from the epidemiological staff of each venereal-disease control branch, the director of the Provincial Laboratory and the magistrates of the city police courts. This group includes all the people directly concerned with venereal-disease control, but does not include representatives of welfare organiza-

tions who will participate in local conferences. It is felt that the regional meeting should be limited to those concerned with the technique of venereal-disease control. Special names may be added by the regional committee.

"The social side of the conference is important. It can be wholly successful only if the officials of the various provinces become well acquainted. At the conclusion of the daily sessions there should be a foregathering for half an hour or so over a cup of tea or other refreshment, and on the first evening four or five private dinners by local officials should take care of all of the out-of-town guests.

"The program should be carefully planned and each discussion should be formally opened by a member of the conference selected as an authority on the subject. He should be informed of his nomination for the task some weeks in advance. The printed program should be in the hands of the conferees at least a week before the meeting, and it should cover the whole field of venereal-disease control, including diagnosis and treatment. It may be thought that purely medical subjects would not be interesting to the lay members of the conference, but this is not so. It is important that the police, Crown prosecutors and magistrates should know something about the difficulties in diagnosis, especially of gonorrhoea in the female, something about the importance of early treatment and something about the interpretation of the Wassermann test in order that they may know that a negative test does not exclude nor does a positive serological test necessarily indicate syphilis.

"There should be an interval of twelve to eighteen months between conferences. A three-day program should be planned for the first conference, but two days will probably be sufficient for subsequent ones.

"The conference should be opened

auspiciously with an address by either the Lieutenant-Governor or the Premier of the host province, or both, and by the Mayor of the conference city. Two committees should then be appointed, one on resolutions and one on publicity. A capable secretary should be provided to make stenographic records of the proceedings. The general expenses, including the preparation, printing and distribution of the proceedings, if it is thought desirable to publish them, should be borne by the host province. With the preliminary arrangements well organized and with a capable chairman in charge, a successful meeting will be assured, and its usefulness will be multiplied many times if each delegate will impart to his staff a comprehensive review of the proceedings when he returns home. It remains for this national conference to designate regions and to appoint a regional committee for each of them."

Subsequently, a Committee on Regional Conferences was appointed, in keeping with Colonel Orr's suggestion, and it recommended that the principle of regular regional conferences be adopted. Three conference areas were named and the following committees were appointed:

1. *Nova Scotia, Prince Edward Island, and New Brunswick:*

Dr. C. W. MacMillan, Deputy Minister of Health, Fredericton, New Brunswick, convener.

Dr. P. S. Campbell, Chief Health Officer, Department of Public Health, Halifax, Nova Scotia.

Dr. B. C. Keeping, Charlottetown, Prince Edward Island.

2. *Ontario and Quebec:*

Dr. Elphège Lalande, Associate Director of the Division of Venereal Diseases, Ministry of Health of Quebec, 89 Notre Dame Street East, Montreal, convener.

Dr. John Leroux, Venereal-Disease Control Officer, Department of

Health, Parliament Buildings, Toronto, Ontario.

3. *Manitoba, Saskatchewan, Alberta, and British Columbia:*

Dr. D. E. H. Cleveland, Acting Director, Division of Venereal Disease Control, Provincial Board of Health, 2700 Laurel Street, Vancouver, British Columbia, convener.

Dr. Harold Orr, Director, Division

of Social Hygiene, Department of Public Health, 329 Tegler Building, Edmonton, Alberta.

Dr. F. C. Middleton, Director, Division of Communicable Disease, Department of Public Health, Regina, Saskatchewan.

Dr. K. J. Backman, Director, Division of Venereal Disease Control, Department of Health and Public Welfare, 320 Sherbrook Street, Winnipeg, Manitoba.

DIAGNOSTIC AND THERAPEUTIC PROCEDURES

THE following recommendations and conclusions were presented by the Committee on Diagnostic and Therapeutic Procedures appointed by the National Venereal Disease Control Conference held in Ottawa on December 6th to 10th:

1. *A definition of communicability for syphilis and gonorrhoea, taking into account casual and intimate contact.*

- (a) Gonorrhoea is always potentially contagious in intimate contact, never in casual contact.
- (b) Syphilis is always potentially contagious in the early stages through intimate contact, rarely if ever through casual contact.

Late, relapsing and untreated syphilis is potentially contagious through intimate contact, rarely if ever through casual contact.

2. *Biological false positive blood tests for syphilis.*

The incidence of false positive tests for syphilis varies with the test used. Flocculation tests give most false positives.

There are 42 conditions that are known to give temporary positive tests up to four months, which tests revert to negative spontaneously. The occasional normal person (1-4000) has sufficient reagin in his blood throughout life to give a fully

positive serological test for syphilis without at any time having evidence of the disease.

3. *A plan for greater use of dark-field facilities.*

It is recommended that facilities available for dark-field examination in all larger centres and in venereal-disease clinics, as well as the provincial capillary pipette service, be made known to all physicians by circular letter. Personnel qualified in dark-field diagnosis should be in attendance. The importance of early diagnosis of all penile and other suspicious sores should be stressed in the same letter.

4. *A plan for greater use of cerebrospinal fluid examinations.*

Examination of the cerebrospinal fluid should be done in all cases of syphilis.

For patients whose treatment requires six months or longer the test should be done at the end of treatment.

For patients receiving shorter courses of treatment the test should be done six months from the time treatment was begun.

It should be done at the beginning of treatment for latent syphilis and need not be repeated if it is negative.

5. *Diagnostic criteria for gonorrhoea in the male and in the female.*

6. *The use and abuse of cultural*

detection of the gonococcus in the diagnosis and for the test of cure in the male and in the female.

5 & 6. For routine cases smear diagnosis is sufficient. In doubtful cases culture should be employed.

7. *The treatment of contacts to gonorrhoea with negative laboratory findings.*

Whenever there is satisfactory epidemiological and sociological evidence that a person is a source of gonorrhoeal infection, that person should be treated for gonorrhoea even though the gonococcus can not be demonstrated.

8. *An outline of treatment for acute uncomplicated gonorrhoea in the male and in the female.*

Outlines of treatment for the services should remain unchanged.

9. *An outline of the principles of treatment of complicated gonorrhoea in the male and in the female.*

10. *The use of artificial fever therapy in the treatment of gonorrhoea.*

9 & 10. Complicated cases should be referred to appropriate specialists.

11. *Non-specific urethritis—differential diagnosis and treatment.*

Differential diagnosis is as for gonorrhoea; cases which do not respond to sulfathiazole or subside spontaneously should be referred to the urologist.

12. *Sulphonamide sensitization.*

Sensitization to sulphonamide does occur occasionally and more frequently after skin application.

13. *The administration of intravenous and intramuscular therapy by non-medical personnel.*

This is not only illegal in some provinces, but not in the best interests of medical education. In the war emergency, however, this practice under medical supervision is

condoned. The prescription of the treatment is the responsibility of the physician.

In isolated areas treatments as prescribed by a qualified practitioner may be given by a trained nurse without direct medical supervision.

14. *Principles in the diagnosis of primary syphilis, secondary syphilis, latent syphilis, congenital syphilis and late syphilis.*

Owing to the difficulties and delay in the preparation of new literature on the subject and the excellence of the publications of the United States Public Health Service, it is recommended that the principles contained in these documents be adopted. It is also suggested that Supplements 5, 6, 7 and 17 to Venereal Disease Information be purchased for distribution.

15. *A minimum standard treatment for syphilis—20 arsenical and 20 bismuth.*

We suggest that minimal treatment should consist of 20 intravenous injections of an arsenical and 20 intramuscular injections of a bismuth compound.

16. *Principles of treatment of latent syphilis.*

The treatment must not be intensive and a preliminary course of bismuth should be given to avoid a Jarisch-Herxheimer reaction. Special consideration should be given the treatment of debilitated patients and patients over fifty years of age.

17. *The control of relapse and infectiousness in syphilis.*

The apparently cured syphilitic patient should be re-examined periodically over a period of five years, once a month for six months and at intervals (longer) thereafter.

18. *The prevention and detection of serious reactions to treatment in syphilis.*

Refer to Supplement No. 6, Vener-

eal Disease Information, United States Public Health Service.

19. *Early preventive treatment (prophylaxis) and its place in the control of venereal disease.*

Early preventive treatment is of value in a venereal-disease control program. An improved post-exposure chemical kit is being developed. It is suggested that the question of

making it available to the general public through proper channels be brought to the attention of the provincial medical officers of health for their consideration.

20. *The isolation and hospitalization of infectious syphilis.*

Isolation and hospitalization of infectious syphilitic patients is not necessary as a routine procedure.

Books

Whooping Cough. By Joseph H. Lapin, B.Chem., M.D., Adjunct Pediatrician, Bronx Hospital, and Associate in Contagion, Riverside Hospital for Contagious Diseases, New York. Springfield, Illinois: Charles C Thomas, 1943. 237 pages, 25 tables. Price \$4.50 in the U.S.A. Published in Canada by The Ryerson Press, Toronto; price \$6.25.

As long as medical journals publish material without the journal or the author bearing tangible responsibility for the reliability of the material, critical digests of the literature, as this book is in part, will be an essential requirement of our so-called scientific armamentarium. The author has attempted, in this monograph, to present an adequate digest of the literature in all phases of whooping cough, and in addition to incorporate his own wide experiences in a clinic for routine prophylaxis and follow-up with well children, in a clinic for the treatment of contacts and ambulatory cases of whooping cough, and in a contagious-disease hospital with complications of whooping cough. He has done this with commendable brevity and clarity. Throughout the text there is evidence of critical appraisal and judgment which greatly enhance the review of the literature. He accepts the evidence that vaccination with vaccine carefully prepared from judiciously selected Phase-I strains of *H. pertussis* is of value, but he is careful to emphasize that there is still very much that is obscure, and much more work to be done before the control of whooping cough is complete.

Extensive but well selected references are

given for each chapter; the index covers approximately 27 pages and adds materially to the value of the book. The subject matter is well balanced; printing and general set-up are admirable. The book is recommended to those engaged in this field, or otherwise interested.

Fundamentals of Health. By Elizabeth Chant Robertson, M.D. Toronto: The Copp Clark Co. Limited. 283 pages. 90c.

IN the preface the author plainly states the purpose of this book, which has been planned for use in secondary schools in Canada and the United States. "This book has been planned," Dr. Robertson says, "to provide the reader with enough easily understandable information to enable him or her to live a healthy life, and at the same time to offer the inspiration for so doing. It contains practical suggestions and advice rather than purely academic information in which students are little interested. A minimum of technical terms has been introduced, and explanations rather than formal definitions have been used throughout."

In the first chapter, in addressing herself to the secondary school pupils, the author reveals the theme: "Without question," she says, "your own habits and activities largely determine the state of your health. In many cases you yourself are to blame when you get sick and in such circumstances you should look upon sickness as a personal disgrace. Work, recreation (especially physical exercise in the fresh air and sunshine), sleep, well-chosen food and proper care of the body all help to keep you healthy."

In the first section, "How to Keep Healthy," elementary information on anatomy and physiology is given in 164 pages. The chapter on "Foods and the Digestive System" receives the most space, 29 pages. The other chapters include: "The Body as a Whole," "The Bones and Joints," "The Muscles," "Posture and the Feet," "Fresh Air and Sunshine," "The Circulation," "The Nervous System," "The Skin, Nails and Hair," "The Eyes," "The Ears," "The Teeth," "Ourselves and Others." One chapter of four pages is devoted to "First Aid Treatment of Injuries to the Bones, Joints and Muscles." The theme of promoting healthy living, indicated by the quotations noted above, through well-balanced diet, proper habits, plenty of fresh air, sunshine and exercise, is well maintained throughout and appropriately related to each subject of instruction.

Section II, "Health Through the Ages," devotes 30 of its 41 pages to pathfinders of health: Harvey, Jenner, Pasteur, Koch, Crawford Long, Horace Wells, Morton, Simpson, Lister, Florence Nightingale, Roentgen, Marie and Pierre Curie, Walter Reed, Osler, Sir Frederick Banting. This chapter, short as it is but showing the highlights in the lives and accomplishments of these people, may do much to stimulate or awaken wide interest and may exert a lasting influence on secondary-school pupils. It might well have been expanded as a reader to the text-book.

"Community Health" is treated in 33 pages under "Some Diseases that Threaten the Nation's Health," "How Preventive Medicine Serves Us," "How Public Health Services are Organized".

The last section on "Safety," indicates something of the extent of the problem of accidents and succinctly deals with the common causes or sources—fire, electricity, automobiles, trains, buses, industry, sports and the home.

Throughout the book the subject matter is clearly presented in a way that secondary-school children will read with interest and will understand. A list of questions at the end of each chapter is provided for the assistance of the teacher and for emphasis of salient points. The general set-up, with liberal use of sub-headings, often in question

form, makes for emphasis and facilitates instruction. The index is complete.

This book will serve well the purpose for which it is intended. It will probably have a wider field; mothers and even fathers will read it and profit by it.

The Infectious Diseases of Domestic Animals. By William Arthur Hagan, D.V.M., D.Sc. Ithaca, N.Y.: Comstock Publishing Company, Inc., 1943. 665 pages. \$6.00 (U.S. funds).

THE title of this book is rather misleading. One recognizes immediately from the table of contents and then from the text itself that it has to do primarily with immunology and microbiology, in which are included the bacteria, fungi, protozoa and viruses. Indeed the author states in his preface that the work is the outgrowth of a lecture course in veterinary bacteriology and immunology. The field covered is obviously very broad and one must give credit to the courage of the author for an undertaking of this kind. The text is exceptionally lucid and well written. Possible reasons for this, if any need be looked for, are the wide range of subject matter necessitating the omission of burdensome detail and the fact that the work had its origin in lecture material.

The section on immunology follows traditional lines in discussing the disease agent-host relationship and then the various antigen-antibody reactions. The standardization of antitoxins, often a difficult subject for students to grasp, is particularly well explained. It is surprising, however, in regard to antitoxins, to find no reference made to the newer methods of processing; for instance, the enzyme digestion method. In antitoxins for human use at any rate the increased refinement obtained represents a very important advance.

An excellent account of the streptococcus group is given, particularly in regard to classification. Anaerobic streptococci, however, are not mentioned and one wonders if they are of no significance in veterinary medicine or if they have an importance not yet recognized. Sulfonamide therapy of such conditions as bovine mastitis has apparently been disappointing and one wonders if penicillin may not find a field of usefulness in animal diseases. Tyrothricin is referred

to and has apparently met with considerable success but toxicity is a complicating factor.

In regard to staphylococci many bacteriologists would take issue with certain views put forward by the author. For instance, "It is quite certain that the various toxins of staphylococci are really only manifestations of one toxin" is a statement which does not seem to take due cognizance of the α and β toxins and the discussion of the subject appears contradictory. Again, it is stated that "an antitoxin prepared with a single strain of staphylococcus will neutralize the toxins of all strains." This could be true but it would depend on the strain used to prepare the antitoxin.

It is obvious that certain omissions and interpretations which are not universally accepted come to light in these pages. That these are of minor importance when taken in perspective with the book as a whole is also obvious. The breadth of its contents and the clarity of expression should make it an outstanding contribution to veterinary literature. And its value does not stop with the veterinary field. It is a book which is richly deserving of attention from medical bacteriologists and hygienists as the author has taken pains to show the relationship between animal and human affairs.

F. O. WISHART

Abstracts

Criteria of Cure in Gonorrhœa

A critical study of treatment results in 926 acute and chronic cases of gonorrhœa is presented in this paper. Thirty-one per cent (286) of this number were discharged as symptomatic, having stopped treatment or having gone elsewhere for treatment. The remaining 69 per cent (640) were symptom-free and negative on clinical grounds after sulfonamide therapy. However, 205 of these patients (32 per cent) had a positive culture at some period during their asymptomatic state following treatment with sulfonamides. Males and females accounted for 28 and 37 per cent respectively of this number. More than half of these positive cultures were obtained after sulfonamide therapy had been terminated for more than one month. However, only 5 per cent were found to be positive for a period of three months and over.

Singling out for analysis uncomplicated, early, acute cases of gonorrhœa treated initially with sulfathiazole, essentially similar results were found. Of 381 such patients, 125 (33 per cent) gave positive cultures for gonococci at some time within 3 months following cessation of sulfathiazole therapy and after they were clinically asymptomatic. Dividing this group into those with a previous history of gonorrhœa and those without, positive cultures in the asymptomatic state were 25 and 37 per cent respectively.

From these results the authors conclude that "An asymptomatic state following the treatment of any stage of gonorrhœa with sulfonamides is not satisfactory evidence of

cure, irrespective of previous history of the disease." They suggest that a bacteriological follow-up should extend over a three-month period and urge that minimum criteria of cure be established in the interest of gonorrhœa control.

Richard A. Koch, Earl N. Mathis and Jacob C. Geiger, *Ven. Dis. Inform.*, 1944, 25: 35.

A Treatment for Pediculosis Capitis

This article describes two lotions which have been prepared for the treatment of pediculosis capitis and found highly effective in clinical trials. The work was undertaken as part of a program in typhus-fever control and because of the unsatisfactory nature of the usual methods employed.

The formulas used were: (1) phenyl cellosolve, 40 per cent, ethanol 30 per cent, water 25 per cent and methyl salicylate 5 per cent; (2) phenyl cellosolve 1 gallon, ethanol 2 gallons, water 2 gallons, and methyl salicylate (to give a slight odour). It is pointed out that lotions of this type (others are ready for clinical trial) possess many advantages. They are extremely cheap, easy to apply, rapid in action, and effective against both insects and eggs. There were two minor disadvantages in that the nits were left on the hair and the lotions produced moderate burning if applied to such tender areas as the eyes, mouth or perineum.

William A. David, *J.A.M.A.*, 1943, 123: 825.

